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Interrelations between the sympathoadrenal system, adrenal cortex, and autonomic tone in seven- to nine-year-old children

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Abstract

Comprehensive study of the functional state of the sympathoadrenal system (SAS) and adrenal cortex (AC) and the specific features of the autonomic regulation of the cardiac rhythm revealed close correlations between the excretion of catecholamines (CAs) and androgens, on the one hand, and the initial autonomic tone (IAT) of the cardiovascular system of children, on the other hand. Most schoolchildren of both sexes with a predominant dependence of their cardiac rhythm on sympathetic influences were shown to excrete more noradrenaline (NA), 17-hydroxycorticosteroids, and 17-ketosteroids and less dopamine than their normotonic and vagotonic counterparts, which was accompanied by an increase in the NA-to-adrenaline ratio. In contrast, eight-and nine-year-old girls exhibited a relatively decreased activity of glucocorticoid functions of the AC associated with sympathicotonia. A local static effort performed as a functional test caused similarly directed changes in the functional states of the SAS and AC in a manner dependent on the child's IAT, age, and sex. In the states of sympathicotonia or normotonia, nine-year-old girls exhibited a decrease in the excretion of CAs and DOPA or their insignificant increase accompanied by strengthening of the functional activity of the AC, especially of its androgen function. This may be interpreted as a manifestation of specific neuroendocrine interrelations in the adaptive mechanisms of nine-year-old girls and a higher stability of the pituitary-adrenal system, which controls metabolic processes in the growing body. In contrast, in normotonic and vagotonic seven-year-old boys (as well as in sympathicotonic eight-year-old boys), the local static effort revealed simultaneous decreases in the reserve potentials of the SAS and AC, probably caused by fatigue and asthenization of these children during their schoolwork. © MAIK Nauka 2008.

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